CLAIMS

[1] A three-dimensional image displaying system, comprising:

an image generating device for classifying, in accordance with a perspective distance, respective pieces of data representing a plurality of objects, and for sequentially outputting the data;

a display device for sequentially executing a display process for the respective pieces of data outputted by the image generating device, and for emitting a plurality of lights, which represent the plurality of objects, multiplexed on a time axis; and

at least one focal length changing device for providing stereoscopic effect or a distance perspective to each of the plurality of objects represented in the multiplexed lights emitted by the display device, and for generating the plurality of lights which are visually recognized in a three-dimensional manner,

the focal length changing device comprising:

an optical path branching circuit for branching, by periodically changing at a predetermined interval a tilt of a micro mirror of at least one DMD internally included in the optical path branching circuit, a plurality of partial lights each representing an object from the multiplexed light emitted by the display device;

a focal length changing section for providing the stereoscopic effect or the distance perspective, which varies among the plurality of objects, to the each of the plurality of objects represented by the partial lights branched by the optical path branching circuit; and

an optical path selecting circuit for selecting, by periodically changing at a substantially same interval as the predetermined interval a tilt of a micro mirror of at least one DMD internally included in the optical path branching circuit, at the predetermined interval the plurality of the partial lights outputted by the focal length changing device, for sequentially outputting the selected partial lights, and for generating three-dimensional image lights.

[2] The three-dimensional image displaying system according to claim 1, wherein the focal length changing section comprises at least one optical component having a particular focal length assigned to a corresponding one of the plurality of partial lights branched by the optical path branching circuit.

[3] The three-dimensional image displaying system according to claim 2 wherein, the optical component is selected from a group consisting of a convex lens, a concave lens, a convex mirror and a concave mirror.

[4] The three-dimensional image displaying system according to claim 2, wherein the optical component is a holographic optical element.

[5] The three-dimensional image displaying system according to claim 1, wherein a plurality of the focal length changing devices are optically connected in series.

[6] The three-dimensional image displaying system according to claim 5, wherein

the focal length changing section further comprises at least one optical component assigned to a corresponding one of the partial lights branched by the optical path branching circuit, and

a focal length of a combination of a plurality of optical components selected from each of the plurality of the focal length changing sections is different from each other.

[7] The three-dimensional image displaying system according to claim 1 further comprising at least one reflection component for reflecting in a direction of an observer a three-dimensional image light outputted by the focal length changing device.

[8] The three-dimensional image displaying system according to claim 7, wherein the reflection component reflects the

three-dimensional-image lights, whereby a three-dimensional image having a plurality of objects three-dimensionally synthesized therein is visually recognized by the observer.

[9] The three-dimensional image displaying system according to claim 7, wherein the reflection component reflects light outputted by the optical path selecting circuit in a predetermined direction, and transmits light entering in from behind the reflection component in a transmitting direction.

[10] The three-dimensional image displaying system according to claim 7, wherein the reflection component is selected from a group consisting of a half mirror, a total reflection mirror and a holographic optical element.

[11] The three-dimensional image displaying system according to claim 1, wherein the DMD includes a plurality of micro mirrors, and selects, by changing a tilt of at least one micro mirror of a predetermined position, a part of the light emitted by each display section.

[12] The three-dimensional image displaying system according to claim 11, wherein the micro mirror of the predetermined position corresponds to a part in which there is no object in the three-dimensional image represented by the three-dimensional

image light.

[13] The three-dimensional image displaying system according to claim 11, wherein the micro mirror of the predetermined position corresponds to a part on a far side of a part in which a plurality of objects overlap with each other in the three-dimensional image represented by the three-dimensional image light.

[14] The three-dimensional image displaying system according to claim 10, wherein

the reflection component reflects light outputted by the optical path selecting circuit in a direction of the observer, and transmits light entering in from behind the reflection component in a transmitting direction, and

the micro mirror of the predetermined position corresponds to a part located farther than where the object existing behind the reflection component is, wherein the object is included in the image represented by the three-dimensional image light.